ABSTRACT OF THE DISCLOSURE

An exhaust passageway of an engine is provided with a NOx storage-reduction catalyst for trapping and storing NOx from an exhaust gas lean of a stoichiometric air-fuel ratio.   When the storage of the NOx in the catalyst becomes large, the engine is operated at a rich air-fuel ratio for a short time so that NOx is released from the catalyst and is removed by reduction.   An electronic control unit of the engine estimates the amount of storage of NOx in the catalyst through the use of NOx counters that are incremented at a predetermined rate during a lean air-fuel ratio operation of the engine, and that are decremented at a predetermined rate during a rich air-fuel ratio operation of the engine. Independent NOx counters are provided for at least two divided portions of the catalyst in a one-to-one correspondence.   By setting the incrementing and decrementing rates of each NOx counter in accordance with the NOx trapping-releasing characteristic of a corresponding one of the portions of the catalyst, it becomes possible to accurately estimate the storage of NOx in the catalyst.